Promoting Snow Fence Adoption in Minnesota

What Was the Need?
MnDOT spends millions of dollars each year on snow and ice control and winter maintenance. Wind blows snow across fields throughout Minnesota, causing it to catch and pile up in and along highways even after clearing operations.

Snow fences—installed plastic and steel barriers, or living fences of shrubs or six to eight rows of corn—can catch drifting snow and keep it from obscuring roadways where it threatens driving safety, increases the need for road salt that can harm fish and wildlife, and creates more maintenance, expense and carbon output for MnDOT. According to a 2012 study on the benefits of living snow fences, if 40% of the 3,700 sites along state and federal roadways that were suitable for snow fences adopted them, MnDOT would save at least $1.3 million.

MnDOT implemented a project that in 2017 trained staff of District 8 in southwest Minnesota how to develop a snow fence outreach program. Nevertheless, snow fence adoption by landowners in the district and around the state has not been as robust as MnDOT would like.

What Was Our Goal?
Investigators from the University of Minnesota’s Center for Integrated Natural Resources and Agricultural Management built upon previous work to improve landowner adoption of snow fences throughout the state. MnDOT wanted to better understand how landowners learn about the snow fence program and its financial incentives for owners, why landowners may still not wish to adopt the technology, and how MnDOT could better encourage snow fence adoption.

What Did We Do?
Researchers divided the state into four areas based on land use and snow experience: southwest, with mixed dairy and crops; southeast, with corn and soy; northwest, where sugar beets predominate; and northeast, which is largely forested. Applying KAP—knowledge, attitudes and practices—methodology, the research team met first with MnDOT staff in each region to determine internal knowledge of the program, its benefits and incentives to adopt, and the transportation corridor in the region that most challenges mobility and maintenance efforts. The team then held community meetings with stakeholders in each region, including residents, city councilpersons, law enforcement and landowners, to discuss snow management problems and snow fence program knowledge.

Then team members surveyed landowners along the problem corridors about their experience with blowing snow control and knowledge of and attitudes toward snow fences and their adoption. Following this survey, the team promoted the snow fence program with posters and on Facebook, and held outreach meetings with landowners from the trouble spots to discuss snow management issues, knowledge of snow fences and grading practices, and snow fence benefits for community mobility and maintenance.
Stacked hay bales make effective snow fences for trapping blowing and drifting snow before it reaches a roadway corridor. The bales can be used for agricultural purposes once winter has passed.

Investigators then surveyed landowners again about snow management problems and the snow fence program. Researchers analyzed both surveys and prepared recommendations for effective snow fence program promotion and adoption, recognition of constraints that impede adoption by farmers and landowners, and strategies and incentives for adopting and managing snow fences.

**What Did We Learn?**
Few landowners are aware of the snow fence program and its safety and mobility benefits for communities. Researchers recommend posting and managing program materials year-round and enjoining city councils and community groups in promotion efforts. Incentives of $1,000 to $1,500 per acre for the footprint of adopted snow fences also require further promotion. Program advocates that themselves manage farms proved particularly effective in outreach.

The constraints identified by landowners were the potential for fences to inconveniently impact cultivation practices and equipment needs, loss of productive land, the need to maintain living or structural fences, desire for help in establishing fences, moisture management and the impermanent appeal of standing corn rows due to crop rotation practices.

Recommendations included working with local soil and water conservation districts to help set up and establish fences; encouraging the use of trees or shrubs in three or four rows for their carbon sequestration qualities and snow capture performance; and stacking hay bales as snow fences, which can then be used for agricultural purposes when winter ends.

**What’s Next?**
Further exploration of adoption barriers and tools for overcoming reluctance will continue. Researchers developed an implementation proposal using smartphone apps for outreach by farmers to other farmers, as well as a database about snow fence locations, costs and a map accessible to app users and MnDOT.

MnDOT is also considering another research project with these investigators to develop case studies of landowners who have installed snow fences, their experience with the program and the constraints they identified in this study.

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